INTRODUCTION

The Turfgrass Research Group at the University of Guelph is pleased to present their annual report for 1986. The report is not a complete recording of all the data collected by the various investigators but it reflects the highlights of their work. If further information is required about any of the projects please contact the authors listed on the article.

1986 was an active year for our group. Field research culminated in a successful, but rain-drenched field-day held at the Cambridge Research Station on 10 September. We want to thank the OTRF for supporting the field-day and we're looking forward to repeating the event next August.

Further appreciation is extended to Gordon Bannerman Ltd., Brower Turf Equipment Ltd. and Turf Care for the loan of equipment in 1986. This support, along with contributions made by companies, agencies and institutions listed on the following page, helped to make 1986 a successful year for turfgrass research.

L.L. Burpee
Editor

ACKNOWLEDGEMENTS

We wish to extend our appreciation to the Ontario Ministry of Agriculture and Food for continued support during the year. The Ontario Turf Research Foundation continued to play a major role, not only in providing funding for a variety of projects, but also by indicating direction the research should take to resolve the problems which occur in the field. We also extend sincere thanks to the agribusiness community who provided extra operating dollars, chemicals and equipment which made many of the projects reported herein a success.

Natural Science and Engineering Research Council
Ontario Turfgrass Research Foundation
The Ontario Ministry of Environment
City of Windsor
The Cutten Club
Hamilton Golf and Country Club
Hoechst Canada Ltd.
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Stauffer Chemical Company of Canada Ltd.
Union Carbide
Weston Golf and Country Club
Aquatrol Corp.
Wellborn Paint Manufacturing Co.
Ag-Turf Chemicals Inc.
W.A. Cleary Chemicals
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The setting of this report in type by Ms. Linda Visentin is sincerely appreciated by the contributors.

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PREEMERGENCE CONTROL OF CRABGRASS GROWN IN MONOCULTURE

J. Christopher Hall and Kathy Christensen
Department of Environmental Biology

EXPERIMENT LOCATION: Cambridge Research Station; CROP: Crabgrass; PLANTING DATE: 86 05 01; PLOT SIZE: 1.0 m by 2.0 m ; EXPERIMENTAL DESIGN: randomized complete block; REPLICATES: 4; AT APPLICATION: Date and Method: 86 05 08-Pre, 40 day split +(5) - 86 06 17; EQUIPMENT: bicycle sprayer; VOLUME: 700 L/ha; PRESSURE: 200 kPa; DATE OF ASSESSMENT: 86 06 10 (T1); 86 07 01 (T2); 86 07 22 (T3); 86 08 12 (T4); 86 09 02 (T5).

TREATMENT	DOSE Kg ai/ha	APPLICATION TIME	% CRABGRASS POPULATION				
			T1	T2	T3	T4	T5
1. Control	------		85	90	100	100	100
2. AC 263,499	0.100	PRE	45	90	100	100	100
3. AC 263,499	0.200	PRE	0	40	100	100	100
4. Chlorthal-dimethyl 75WP	10.0+(5)	PRE	0	0	0	2	5
5. Chlorthal-dimethyl WDG*	10.0+(5)	PRE	0	0	0	0	4
6. Chlorthal-dimethyl FLOW*	10.0+(5)	PRE	0	0	0	0	2
7. Chlorthal-dimethyl FLOW*	15.00	PRE	0	0	0	0	2
8. EPTC (10G)	7.00	PRE	42	80	97	97	97
9. EPTC (10G)	8.50	PRE	22	57	80	92	82
10.Pendimethalin W.C. 60WDG*	1.68	PRE	0	0	2	4	15
11.Pendimethalin T.W.C.*	1.68	PRE	0	0	1	8	23
12.Pendimethalin TF+ WC*	1.68	PRE	4	5	35	18	33
13.Pendimethalin TB+ HALTS*	1.68	PRE	4	5	48	28	48
14.Trifluralin* (EC)	1.70	PRE	0	4	18	14	26
15.Trifluralin* (EC)	2.20	PRE	0	4	10	15	18
16.Bensulide* (EC)	11.20	PRE	0	0	0	0	3
17.Bensulide* (EC)	14.00	PRE	0	0	0	0	0
18.Bensulide* (EC)	16.80	PRE	0	0	0	0	0
19.Control	------		75	93	100	100	98

* trifluralin-Treflan; bensulide-betasan; WDG-wettable dispersal granule; FLOW-flowable; T.W.C.-turf weedgrass control; TF-turf fertilizer; WC-weedgrass control; TB-turf builder

Crabgrass was grown as a pure stand. Excellent long term (more than 4 months) crabgrass control was achieved with all formulations of chlorthal-dimethyl and all doses of bensulide. Excellent weed control was achieved for more than two months with all doses of trifluralin and the T.W.C. and 60WDG formulations of pendimethalin. The TF+WC and TB+Halts formulations of pendimethalin controlled crabgrass germination for approximately two months after treatment. The highest dose of AC 263499 provided excellent weed control for one month after treatment. EPTC did not provide satisfactory crabgrass control.

POSTEMERGENCE CONTROL OF CRABGRASS IN 2-3 LEAF STAGE

J. Christopher Hall and Kathy Christensen
Department of Environmental Biology

EXPERIMENT LOCATION: Cambridge Research Station; CROP: Crabgrass; PLANTING DATE: 86 05 01, reseeded 86 05 22; PLOT SIZE: 1.0 m by 2.0 m; EXPERIMENTAL DESIGN: randomized complete block; REPLICATES: 4; AT APPLICATION: Date and Method: 86 06 17, POST; EQUIPMENT: bicycle sprayer; VOLUME: 400 L/ha; PRESSURE: 200 KPa; DATE OF ASSESSMENT: 86 07 01 (T1); 86 07 22 (T2); 86 08 12 (T3); 86 09 02 (T4).

TREATMENT	DOSE Kg ai/ha	APPLICATION TIME	% CRABGRASS POPULATION			
			T1	T2	T3	T4
1. Control	------		90	100	100	100
2. Fenoxaprop-ethyl (120EC)	0.150	POST	10	10	10	10
3. Fenoxaprop-ethyl (120EC)	0.200	POST	0	3	15	38
4. Fenoxoprop-ethyl (120EC)	0.250	POST	0	5	5	16
5. Tridiphane	1.100	POST	60	88	100	100
6. Tridiphane	1.700	POST	60	78	85	93
7. Tridiphane	2.200	POST	35	38	90	95
8. AC 263499 + 0.25% Triton	0.100	POST	0	13	43	73
9. AC 263499 + 0.25% Triton	0.150	POST	10	25	38	83
10. AC 263499 + 0.25% Triton	0.200	POST	0	8	25	60
11. MSMA	2.200	POST	15	48	60	68
12. MSMA	3.300	POST	0	10	48	55
13. MSMA	4.400	POST	0	10	29	25
14. Control	------		88	100	98	100

Crabgrass was grown as a pure stand. Excellent weed control was achieved for more than 2 months with all doses of fenoxaprop-ethyl. Excellent weed control was achieved for one month with 3.3 and 4.4 kg ai/ha doses of MSMA and the highest dose of AC 263499. The 2.2 kg ai/ha dose of tridiphane suppressed the crabgrass population for approximately one month, however adequate weed control was not achieved.

PHYTOTOXIC EFFECTS OF PRE- AND POST-EMERGENCE CRABGRASS HERBICIDES ON KENTUCKY BLUEGRASS

J. Christopher Hall and Kathy Christensen
Department of Environmental Biology

EXPERIMENT LOCATION: Cambridge Research Station; CROP: Kentucky Bluegrass; PLOT SIZE: 1.0 m by 2.0 m; EXPERIMENTAL DESIGN: randomized complete block; REPLICATES: 4; AT APPLICATION: Date and Method: 86 05 05, 40 day split +(5) - 86 06 17; EQUIPMENT: bicycle sprayer; VOLUME: 700 L/ha; PRESSURE: 200 KPa; DATE OF ASSESSMENT: 86 05 30 (T1); 86 06 10 (T2); 86 06 27 (T3); 86 07 08 (T4); 86 07 22 (T5); 86 08 05 (T6).

TREATMENT	DOSE Kg ai/ha	% INJURY					
		T1	T2	T3	T4	T5	T6
1 Control	------	0	0	0	0	0	0
2 Fenoxaprop-ethyl (120EC)	0.15	0	0	0	0	0	0
3 Fenoxaprop-ethyl (120EC)	0.2	40	40	0	0	0	0
4 Fenoxaprop-ethyl (120EC)	0.25	50	50	0	0	0	0
5 Tridiphane	1.1	0	0	0	0	0	0
6 Tridiphane	1.7	0	0	0	0	0	0
7 Tridiphane	2.2	0	0	0	0	0	0
8 AC 263,499	0.1	0	0	0	0	0	0
9 AC 263,499	0.15	0	0	0	0	0	0
10 AC 263,499	0.2	0	0	0	0	0	0
11 Chlorthal-dimethyl 75WP	10.0+(5)	0	0	0	0	0	0
12 Chlorthal-dimethyl WDG*	10.0+(5)	0	0	0	0	0	0
13 Chlorthal-dimethyl FLOW*	10.0+(5)	0	0	0	0	0	0
14 Chlorthal-dimethyl FLOW*	15	0	0	0	0	0	0
15 Pendimethalin WC60WDG*	1.68	0	0	0	0	0	0
16 Pendimethalin TWC*	1.68	0	0	0	0	0	0
17 Pendimethalin TB+WC*	1.68	0	0	0	0	0	0
18 Pendimetholin TB+HALTS*	1.68	0	0	0	0	0	0
19 Trifluralin*	1.7	0	0	0	0	0	0
20 Trifluralin*	1.95	0	0	0	0	0	0
21 Trifluralin*	2.2	0	0	0	0	0	0

* trifluralin-Treflan (EC)
WDG-wettable dispersable granule; FLOW-flowable; T.W.C.- turf weedgrass control; TF-turf fertilizer; WC-weedgrass control; TB-turf builder

This experiment was conducted to determine if pre- and post-emergence herbicides used for crabgrass control would injure established Kentucky bluegrass. Fenoxaprop-ethyl was the only herbicide that caused any injury to Kentucky bluegrass, with injury persisting for approximately 45 days after treatment.

BROADLEAF WEED CONTROL IN KENTUCKY BLUEGRASS

J. Christopher Hall and Kathy Christensen
Department of Environmental Biology

EXPERIMENT LOCATION: Cambridge Research Station; CROP: Kentucky bluegrass; PLOT SIZE: 2.0 m by 3.0 m EXPERIMENTAL DESIGN: randomized complete block; REPLICATES: 4; AT APPLICATION: Date and Method: 86 05 22, POST; EQUIPMENT: bicycle sprayer; VOLUME: 1000 L/ha; PRESSURE: 200 KPa; DATE OF ASSESSMENT: Weed count of two weed species; dandelion and chickweed; treated 86 05 22; rated 86 05 12 (T1); 86 06 10 (T2); 86 07 01 (T3); 86 0723 (T4).

TREATMENT	DOSE	NUMBER OF WEEDS PER PLOT							
		T1*		T2		T3		T4	
		DL	CH	DL	CH	DL	CH	DL	CH
1 Control	------------	7	3	7	2	8	4	7	2
2 Killex	60 ml/100 m2	6	3	0	0	0	0	1	0
3 Trimex	60 ml/100 m2	7	1	0	0	0	0	1	0
4 INT-86061	60 ml/100 m2	6	3	0	0	0	0	0	0
5 INT-86062	60 ml/100 m2	14	5	0	0	1	0	3	1
6 INT-86063	60 ml/100 m2	8	2	1	0	2	0	5	0
7 INT-86064	60 m11100 m2	17	4	2	0	3	1	4	1
8 INT-86065	60 ml/100 m2	14	7	1	0	0	1	1	1
9 Bromoxynil	1 Kg/ha	17	3	12	3	11	4	14	2
10 Bromoxynil	2 Kg/ha	17	6	13	4	13	6	19	3
11 Bromoxynil / Canplus	1 Kg/ha / 1%	15	3	10	2	12	3	18	1
12 Bromoxynil / Canplus	2 Kg/ha / 1%	20	4	15	4	17	4	17	3
13 Turflon II (XRM-4814)	3 L Prod/ha	18	3	1	1	0	3	5	1
14 Turflon II (XRM-4814)	4.2 L Prod/ha	15	3	2	3	0	3	2	2
15 Turflon D	4.2 L Prod/ha	15	4	1	0	1	3	2	1
16 Turflon D	4.8 L Prod/ha	10	4	0	0	1	0	4	0
17 Fluroxypyr (EF-689)	0.14 Kg/ha	16	3	8	0	10	2	20	1
18 Fluroxypyr (EF-689)	0.28 Kg/ha	10	1	10	2	6	0	10	0
19 Fluroxypyr (EF-689)	0.42 Kg/ha	13	0	11	0	6	0	10	2
20 Fluroxypyr (EF-689)	0.56 Kg/ha	13	1	9	0	4	0	10	0
21 Control	------------	10	3	4	5	10	6	16	5

Weed counts/plot prior to herbicide application (TI)
/ indicates tank mix
DL-dandelion; CH-chickweed

Weed counts per plot were taken prior to application of the herbicides (T1). Excellent dandelion and mouse-eared chickweed control was achieved with Killex, Trimex, all INT formulations and all doses of Turflon II and Turflon D. Adequate control of dandelion was not achieved with any dose of fluroxypyr. Bromoxynil did not provide adequate control of dandelion or mouse-eared chickweed.

EFFECT OF GRANULAR EPTC AS A GROWTH REGULATOR ON THREE SPECIES OF GRASS

J. Christopher Hall and Kathy Christensen
Department of Environmental Biology

EXPERIMENT LOCATION: Cambridge Research Station; CROP: bentgrass, Kentucky bluegrass and annual bluegrass; PLANTING DATE: 85 08 15; PLOT SIZE: 1.0 m by 2.0 m ; EXPERIMENTAL DESIGN: randomized complete block; REPLICATES: 4; AT APPLICATION: Date and Method: Treated 86 05 15, POST; EQUIPMENT: Scotts 1 m granular plot spreader; DATE OF ASSESSMENT: 86 06 02 (T1); 86 06 16 (T2); 86 07 01 (T3); 86 07 16 (T4).

TREATMENT	DOSE Kg ai/ha	HEIGHT (mm)											
		T1			T2			T3			T4		
		BT	KB	AB	BT	KB	AB	BT	KB	AB	BT	KB	AB
1. Control	----	57	124	41	104	239	155	129	386	202	197	489	87
2. EPTC 10G	7.00	20	50	11	48	155	80	87	237	172	131	380	85
3. EPTC 10G	8.50	18	48	16	56	141	64	83	231	167	152	347	81
4. EPTC 10G	10.00	21	43	13	52	120	56	94	212	149	149	328	66

TREATMENT	DOSE Kg ai/ha	% SEEDHEAD											
		T1			T2			T3			T4		
		BT	KB	AB	BT	KB	AB	BT	KB	AB	BT	KB	AB
1. Control	----	9	75	84	36	85	100	78	45	100	68	13	35
2. EPTC 10G	7.00	4	9	15	4	14	85	38	33	100	48	25	45
3. EPTC 10G	8.50	0	15	8	4	10	85	34	25	100	38	18	48
4. EPTC 10G	10.00	8	30	8	5	14	75	28	35	100	53	30	48

TREATMENT	DOSE Kg ai/ha	INJURY											
		T1			T2			T3			T4		
		BT	KB	AB	BT	KB	AB	BT	KB	AB	BT	KB	AB
1. Control	----	0	0	0	0	0	0	0	0	0	0	0	0
2. EPTC 10G	7.00	50	50	40	40	30	40	30	30	30	20	20	70
3. EPTC 10G	8.50	50	50	50	40	30	40	30	20	30	20	20	70
4. EPTC 10G	10.00	40	40	30	50	40	40	30	30	40	20	20	70

BT-bentgrass; KB-Kentucky bluegrass; AB-annual bluegrass

Experiments were conducted to determine the effect of EPTC on height, seedhead production and quality of three turf species. All doses of EPTC markedly suppressed the growth of the three species for at least 45 days after treatment. Seedhead development was suppressed for at least one month in Kentucky bluegrass and bentgrass and for approximately 20 days in annual bluegrass. All grass species were severely injured. EPTC may be acceptable as a growth regulator in rough turf areas but because it induces severe injury it is not acceptable for use on fine turf at the doses used in this experiment. Further work will be conducted to determine doses that will not be as injurious to turf and yet will provide seedhead suppression and height reduction. Studies will include EPTC applied alone or in combination with other growth regulators.

SETHOXYDIM FOR CONTROL OF BENTGRASS

J. Christopher Hall and Kathy Christensen
Department of Environmental Biology

EXPERIMENT LOCATION: Cambridge Research Station; CROP: Kentucky bluegrass and bentgrass; PLANTING DATE: 85 08 15; PLOT SIZE: 1.0 m by 2.0 m; EXPERIMENTAL DESIGN: randomized complete block; REPLICATES: 4; AT APPLICATION: Date and Method: 86 06 17-Post; EQUIPMENT: bicycle sprayer; VOLUME: 700 L/ha; PRESSURE: 200 KPa; DATE OF ASSESSMENT: 86 06 25 (T1); 86 07 08 (T2); 86 07 23 (T3); 86 08 06 (T4); 86 08 19 (T5).

TREATMENT	DOSE Kg ai/ha	APPLICATION TIME	INJURY									
			T1		T2		T3		T4		T5	
			BG	KB	BG	KB	BG	KB	BG	KB	BG	KB
1. Control	-----		0	0	0	0	0	0	0	0	0	0
2. Sethoxydim	0.050	POST	50	30	30	20	20	30	30	20	30	20
3. Sethoxydim	0.100	POST	60	40	40	30	40	30	30	20	30	20
4. Sethoxydim	0.150	POST	60	40	70	40	60	30	50	20	40	10
5. Sethoxydim	0.200	POST	70	50	70	40	70	30	60	20	50	20

BG-Bentgrass; KB-Kentucky bluegrass

Sethoxydim was applied to pure stands of Kentucky bluegrass and bentgrass. Sethoxydim suppressed the height of both species for at least one month after treatment, however both species were injured by all doses of sethoxydim. Bentgrass was injured more than Kentucky bluegrass. Due to the differences in sensitivity between the species, doses of 0.20 kg ai/ha or higher may hold promise for the selective removal of bentgrass from Kentucky bluegrass swards. Further work is underway to test this hypothesis.

FENOXAPROP-ETHYL APPLIED ALONE OR AS A TANK MIX WITH 2,4-D OR DPX-M6316 FOR THE CONTROL OF CRABGRASS

J. Christopher Hall and Kathy Christensen
Department of Environmental Biology

EXPERIMENT LOCATION: Cambridge Research Station; CROP: Crabgrass; PLANTING DATE: 86 05 01, reseeded 86 05 22; PLOT SIZE: 1.0 m by 2.0 m; EXPERIMENTAL DESIGN: randomized complete block; REPLICATES: 4; AT APPLICATION: Date and Method: 86 07 21, POST; EQUIPMENT: bicycle sprayer; VOLUME: 400 L/ha; PRESSURE: 200 KPa; CROP GROWTH STAGE: 4-6 tiller; DATE OF ASSESSMENT: 86 07 28 (T1); 86 08 21 (T2); 86 08 28 (T3); 86 09 04 (T4).

TREATMENT	DOSE Kg ai/ha	APPLICATION TIME	% CRABGRASS POPULATION			
			T1	T2	T3	T4
1. Control			100	100	100	100
2. Fenoxyprop-ethyl (90 EC)	0.15	POST	40	28	49	31
3. Fenoxyprop-ethyl (90 EC)	0.20	POST	33	4	5	9
4. Fenoxyprop-ethyl (90 EC)	0.25	POST	48	5	5	5
5. 2,4-D (480 amine)	0.800	POST	73	80	73	93
6. Fenoxyprop-ethyl / 2,4-D	0.15 / 0.800	POST	73	50	75	95
7. Fenoxyprop-ethyl / 2,4-D	0.20 / 0.800	POST	73	58	68	88
8. Fenoxyprop-ethyl / 2,4-D	0.25 / 0.800	POST	60	55	73	83
9. 2,4-D (480 amine)	1.000	POST	100	55	63	98
10. Fenoxyprop-ethyl / 2,4-D	0.15 / 1.000	POST	78	70	58	85
11. Fenoxyprop-ethyl / 2,4-D	0.20 / 1.000	POST	80	60	68	80
12. Fenoxyprop-ethyl / 2,4-D	0.25 / 1.000	POST	83	65	75	85
13. 2,4-D (480 amine)	1.200	POST	73	58	75	98
14. Fenoxyprop-ethyl / 2,4-D	0.15 / 1.200	POST	80	68	83	88
15. Fenoxyprop-ethyl / 2,4-D	0.20 / 1.200	POST	70	63	78	83
16. Fenoxyprop-ethyl / 2,4-D	0.25 / 1.200	POST	80	75	73	90
17. Control			100	95	85	100
18. Killex	0.800	POST	100	100	88	100
19. Fenoxyprop-ethyl / Killex	0.15 / 0.800	POST	70	55	73	75
20. Fenoxyprop-ethyl / Killex	0.20 / 0.800	POST	63	65	75	88
21. Fenoxyprop-ethyl / Killex	0.25 / 0.800	POST	50	48	60	65
22. Killex	1.000	POST	100	80	90	100
23. Fenoxyprop-ethyl / Killex	0.15 / 1.000	POST	88	80	88	90
24. Fenoxyprop-ethyl / Killex	0.20 / 1.000	POST	65	55	80	85
25. Fenoxyprop-ethyl / Killex	0.25 / 1.000	POST	55	56	68	78
26. Killex	1.200	POST	93	80	83	100
27. Fenoxyprop-ethyl / Killex	0.15 / 1.200	POST	78	65	88	93
28. Fenoxyprop-ethyl / Killex	0.20 / 1.200	POST	90	90	90	70
29. Fenoxyprop-ethyl / Killex	0.25 / 1.200	POST	60	60	68	78
30. DPX M6316 (75 WP)	0.016	POST	100	70	90	100
31. Fenoxyprop-ethyl / DPX M6316	0.15 / 0.016	POST	60	16	12	25
32. Fenoxyprop-ethyl / DPX M6316	0.20 / 0.016	POST	45	4	6	5
33. Fenoxyprop-ethyl / DPX M6316	0.25 / 0.016	POST	40	9	9	6
34. DPX M6316 (75 WP)	0.024	POST	100	83	70	98
35. Fenoxyprop-ethyl / DPX M6316	0.15 / 0.024	POST	65	21	28	25
36. Fenoxyprop-ethyl / DPX M6316	0.20 / 0.024	POST	63	9	6	9
37. Fenoxyprop-ethyl / DPX M6316	0.25 / 0.024	POST	35	4	4	5

Crabgrass was grown as a pure stand. Excellent crabgrass control was achieved with 0.20 and 0.25 Kg ai/ha doses of fenoxyprop-ethyl applied alone or in combination with DPX M6316. The herbicidal action of fenoxaprop-ethyl on crabgrass was severely antagonized when tank mixed with Killex or 2,4-D.

GROWTH REGULATOR STUDIES ON BENTGRASS

J. Christopher Hall and Kathy Christensen
Department of Environmental Biology

EXPERIMENT LOCATION: Cambridge Research Station; CROP: bentgrass; PLANTING DATE: 85 08 15; PLOT SIZE: 1.0 m by 2.0 m; EXPERIMENTAL DESIGN: randomized complete block; REPLICATES: 4; AT APPLICATION: Date and Method: 86 05 14, POST; EQUIPMENT: bicycle sprayer; VOLUME: 700 L/ha; PRESSURE: 200 KPa; DATE OF ASSESSMENT: 86 06 02 (Tl); 86 06 16 (T2); 86 07 01 M); 86 07 16 (T4); 86 07 28 (175).

TREATMENT	DOSE Kg ai/ha	BENTGRASS														
		Tl			T2			T3			T4			T5		
		HT*	SH*	C*	HT*	SH*	C*	HT*	SH*	C*	HT*	SH*	C*	HT*	SH*	C*
1. Control	-----	67	0	0	114	29	0	142	58	0	211	43	0	232	0	0
2. Paclobutrazol	0.250	56	0	30	62	15	30	93	45	40	134	43	20	174	0	20
3. Paclobutrazol	0.500	51	0	10	52	5	40	72	43	40	101	30	30	155	0	20
4. Paclobutrazol	1.000	41	0	30	44	0	60	63	29	50	118	23	40	136	0	30
5. Paclobutrazol	1.500	27	0	20	29	0	60	47	19	60	62	15	40	100	0	50
6. Paclobutrazol	2.000	39	0	30	29	0	60	48	8	60	62	20	60	100	0	60
7. XE-1019	0.070	62	0	10	70	7	30	93	40	30	108	53	20	154	0	30
8. XE-1019	0.140	44	0	20	45	1	50	60	21	50	75	18	40	109	0	40
9. XE-1019	0.210	46	0	20	44	0	50	56	16	50	79	20	40	121	0	40
10. XE-1019	0.280	42	0	20	38	0	60	47	18	60	57	14	60	84	0	60
11. XE-1019	0.350	39	0	30	33	0	60	38	24	60	55	10	60	65	0	60
12. Flurprimidol	1.000	44	0	20	63	3	40	82	23	30	120	25	20	188	0	20
13. Flurprimidol	2.000	31	0	30	49	0	50	58	18	50	82	28	40	123	0	50
14. Flurprimidol	3.000	38	0	40	32	0	60	46	23	60	67	35	50	95	0	60
15. Flurprimidol	4.000	34	0	40	31	0	60	37	25	60	66	43	60	96	0	60
16. Mefluidide	0.100	45	0	20	77	10	20	103	35	20	129	45	20	180	0	20
17. Mefluidide	0.200	40	0	40	73	8	20	104	33	10	137	58	20	149	0	20
18. Mefluidide	0.300	40	0	40	79	9	20	117	35	10	157	40	20	178	0	20
19. Mefluidide	0.400	37	0	50	74	9	20	102	30	10	150	40	20	187	0	20
20. Paclobutrazol /	0.50	32	0	60	51	0	50	72	8	50	98	8	30	149	0	40
Mefluidide	0.20															
21. Paclobutrazol /	1.00	31	0	60	36	0	50	57	0	50	70	5	40	109	0	40
Mefluidide	0.20															
22. Paclobutrazol /	1.50	28	0	40	31	0	50	53	0	50	61	0	50	101	0	50
Mefluidide	0.20															
23. XE-1019 /	0.14	35	0	60	42	0	50	57	0	50	80	0	50	95	0	50
Mefluidide	0.20															
24. XE-1019 /	0.21	29	0	60	34	0	60	46	0	60	64	0	50	88	0	60
Mefluidide	0.20															
25. XE-1019 /	0.28	28	0	60	26	0	60	37	0	60	54	0	60	67	0	60
Mefluidide	0.20															
26. Control	-----	69	0	0	106	34	0	136	63	0	174	0	0	172	0	0
LSD 0.05		11.5			20.6			19.7			42.0			36.6		

* HT- height; SH- seedheads (% of plot); C-colour 0=no change

The growth of bentgrass was suppressed for more than two months with the higher doses of paclobutrazol, XE-1019, and flurprimidol. There was some reduction but not complete inhibition of seedhead production with paclobutrazol, XE-1019, and flurprimidol. However, when paclobutrazol or XE-1019 were tanked mixed with mefluidide seedhead formation was completely inhibited. The growth regulating effects of paclobutrazol, XE-1019, and flurprimidol dissipated completely by the end of August. Some color change was induced by all compounds. Plots treated with paclobutrazol, XE1019, or flurprimidol were darker green. Mefluidide applied alone or in combination with other growth regulators caused the plots to yellow.

GROWTH REGULATOR STUDIES ON KENTUCKY BLUEGRASS

J. Christopher Hall and Kathy Christensen
Department of Environmental Biology

EXPERIMENT LOCATION: Cambridge Research Station; CROP: K. bluegrass; PLANTING DATE: 85 08 15; PLOT SIZE: 1.0 m by 2.0 m; EXPERIMENTAL DESIGN: randomized complete block; REPLICATES: 4; AT APPLICATION: Date and Method: 86 05 14, POST; EQUIPMENT: bicycle sprayer; VOLUME: 700 L/ha; PRESSURE: 200 KPa; DATE OF ASSESSMENT: 86 06 02 (TI); 86 06 16 (T2); 86 07 01 (T3); 86 07 16 (T4); 86 07 28 (T5).

TREATMENT	DOSE Kg ai/ha	KENTUCKY BLUEGRASS														
		T1			T2			T3			T4			T5		
		HT*	SH*	C*	HT*	SH*	C*	HT*	SH*	C*	HT*	SH*	C*	HT*	SH*	C*
1. Control	------	137	73	0	249	83	0	353	68	0	462	50	0	451	3	0
2. Paclobutrazol	0.250	105	83	0	120	80	40	154	65	30	236	53	30	366	0	20
3. Paclobutrazol	0.500	96	88	0	83	100	50	113	78	40	162	50	40	206	0	30
4. Paclobutrazol	1.000	94	57	10	75	90	50	80	65	50	88	45	40	142	3	40
5. Paclobutrazol	1.500	95	68	20	72	100	50	75	90	50	63	68	60	100	-8	50
6. Paclobutrazol	2.000	105	60	10	77	100	50	82	85	50	72	65	60	88	13	50
7. XE-1019	0.070	116	93	10	129	100	50	132	95	40	147	53	40	196	13	30
8. XE-1019	0.140	105	60	20	105	95	50	88	93	50	101	77	60	109	8	60
9. XE-1019	0.210	100	50	10	92	100	50	77	100	50	70	75	60	84	28	60
10. XE-1019	0.280	103	70	20	89	95	50	70	95	50	69	80	60	84	20	60
11. XE-1019	0.350	106	85	20	79	100	50	68	100	50	62	88	70	68	38	70
12. Flurprimidol	1.000	100	48	10	143	98	30	234	75	30	241	53	20	297	0	20
13. Flurprimidol	2.000	97	88	20	79	100	50	80	83	50	97	60	50	120	18	50
14. Flurprimidol	3.000	94	62	20	75	100	50	78	93	50	84	45	50	108	5	50
15. Flurprimidol	4.000	96	78	20	70	88	50	63	93	50	57	65	60	80	15	60
16. Mefluidide	0.100	77	35	50	159	14	20	219	33	20	311	30	20	340	0	20
17. Mefluidide	0.200	73	0	50	159	5	20	231	20	20	352	38	20	315	0	20
18. Mefluidide	0.300	73	0	40	167	9	80	242	18	80	394	43	90	367	3	80
19. Mefluidide	0.400	72	0	60	157	3	20	265	18	20	396	25	20	412	0	20
20. Paclobutrazol /	0.500	66	13	50	69	0	40	98	3	50	133	3	30	189	0	30
Mefluidide.	0.200															
21. Paclobutrazol /	1.000	70	0	50	59	0	60	74	3	60	104	3	40	164	0	50
Mefluidide.	0.200															
22. Paclobutrazol /	1.500	61	0	50	53	0	70	62	0	60	74	5	40	120	0	50
Mefluidide.	0.200															
23. XE-1019 /	0.140	73	0	50	67	0	70	68	0	60	84	5	40	110	0	50
Mefluidide.	0.200															
24. XE-1019 /	0.210	64	23	40	56	0	70	63	0	60	61	3	60	103	0	60
Mefluidide.	0.20															
25. XE-1019 /	0.28	66	20	50	52	0	70	53	0	70	54	3	60	74	0	60
Mefluidide.	0.20															
26. Control	-------	131	95	100	238	90	100	328	55	90	436	33	90	386	3	80
LSD. 0.05		14			30			50			59			61		

* HT- height; SH- seedheads (% of plot); C-colour, 0 = no change

The growth of kentucky bluegrass was suppressed for more than two months with all doses of paclobutrazol, XE-1019, and flurprimidol. There was no reduction in seedhead production with paclobutrazol, XE-1019, and flurprimidol. However, when paclobutrazol or XE-1019 was tank mixed with mefluidide seedhead formation was completely inhibited. The growth regulating effects of paclobutrazol, XE-1019, and flurprimidol dissipated completely by the end of August. Some colour change was induced by all growth regulators. Plots treated with paclobutrazol, XE-1019, or flurprimidol were darker green. Mefluidide applied alone or in combination with the other growth regulators caused the grass to yellow.

GROWTH REGULATOR STUDIES ON ANNUAL BLUEGRASS

J. Christopher Hall and Kathy Christensen
Department of Environmental Biology

EXPERIMENT LOCATION: Cambridge Research Station; CROP: annual bluegrass; PLANTING DATE: 85 08 15; PLOT SIZE: 1.0 m by 2.0 m; EXPERIMENTAL DESIGN: randomized complete block; REPLICATES: 4; AT APPLICATION: Date and Method: 86 05 14, POST; EQUIPMENT: bicycle sprayer; VOLUME: 700 L/ha; PRESSURE: 200 KPa; DATE OF ASSESSMENT: 86 06 02 (T1); 86 06 16 (T2); 86 07 01 M); 86 07 16 (T4); 86 07 28 (T5).

TREATMENT	DOSE Kg ai/ha	ANNUAL BLUEGRASS T1			T2			T3			T4			T5		
		HT*	SH*	C*	HT*	SH*	C*	HT*	SH*	C*	HT*	SH*	C*	HT*	SH*	C*
1. Control	------	75	98	0	148	100	0	200	100	0	158	53	0	119	0	60
2. Paclobutrazol	0.250	31	48	0	46	85	50	98	85	60	91	53	50	101	0	50
3. Paclobutrazol	0.500	26	33	40	28	90	50	86	65	60	78	35	60	120	0	50
4. Paclobutrazol	1.000	22	25	40	18	53	60	35	35	60	45	18	70	79	0	70
5. Paclobutrazol	1.500	30	33	50	21	75	40	37	53	40	57	15	30	119	0	50
6. Paclobutrazol	2.000	24	20	60	16	55	40	33	41	40	51	18	30	65	0	30
7. XE-1019	0.070	28	33	40	34	75	60	50	70	60	84	30	50	103	0	60
8. XE-1019	0.140	27	34	40	36	33	60	40	23	60	63	20	60	110	0	60
9. XE-1019	0.210	31	45	40	26	35	60	36	35	60	58	28	60	119	0	60
10. XE-1019	0.280	26	35	60	17	25	40	31	10	70	51	10	70	104	0	70
11. XE-1019	0.350	27	34	50	17	13	70	30	15	70	54	18	70	108	0	60
12. Flurprimidol	1.000	45	60	40	48	75	40	101	85	40	98	40	30	93	0	70
13. Flurprimidol	2.000	25	29	60	24	55	40	44	45	30	58	25	30	74	0	50
14. Flurprimidol	3.000	20	18	50	23	35	30	30	36	30	53	18	30	85	0	30
15. Flurprimidol	4.000	18	18	50	13	23	30	2	18	30	46	10	20	90	0	30
16. Mefluidide	0.100	40	83	30	128	100	0	181	100	20	138	48	30	124	0	60
17. Mefluidide	0.200	41	70	30	164	100	0	202	100	20	161	33	30	115	0	70
18. Mefluidide	0.300	38	45	40	162	100	0	210	100	20	142	55	30	111	0	60
19. Mefluidide	0.400	41	25	50	144	100	0	208	100	20	139	35	40	134	0	50
20. Paclobutrazol / Mefluidide	0.500 0.200	20	8	40	28	80	50	20	70	50	88	28	40	114	0	30
21. Paclobutrazol / Mefluidide	1.000 0.200	19	3	60	23	85	50	43	60	70	75	20	70	116	0	70
22. Paclobutrazol / Mefluidide	1.500 0.200	16	0	60	19	78	50	39	35	70	51	18	70	140	0	60
23. XE-1019 / Mefluidide	0.140 0.200	20	13	60	24	83	50	45	48	70	87	15	70	108	0	70
24. XE-1019 / Mefluidide	0.210 0.200	21	10	50	25	70	60	37	38	70	70	20	70	113	0	70
25. XE-1019 / Mefluidide	0.280 0.200	19	8	60	18	63	60	28	35	70	53	23	70	94	0	70
26. Control	-------	63	100	0	134	100	0	165	100	0	189	50	0	125	0	0
LSD 0.05		19			22			25			29			45		

* HT-height; SH-seedheads (% of plot); C-colour, 0 = no change

The growth of annual bluegrass was suppressed for more than two months with all doses of paclobutrazol, XE-1019, and flurprimidol. There was some reduction but not complete inhibition of seedhead production with the higher doses of paclobutrazol and all doses of XE-1019 and flurprimidol. Seedhead production was reduced for only three weeks with mefluidide. However, during the same three week period, seedhead production was supressed completely by tank mixes of mefluidide with paclobutrazol or XE-1019. The growth regulating effects of paclobutrazol, XE-1019, and flurprimidol dissipated completely by the end of August. Some colour change was induced by all growth regulators. Plots treated with paclobutrazol, XE-1019 or flurprimidol were darker green. Mefluidide applied alone or in combination with other growth regulators caused the grass to yellow.

TRIDIPHANE APPLIED ALONE OR AS A TANK MIX WITH 2,4-D FOR THE CONTROL OF CRABGRASS

J. Christopher Hall and Kathy Christensen
Department of Environmental Biology

EXPERIMENT LOCATION: Cambridge; CROP: Crabgrass; PLANTING DATE: 86 05 01, reseeded: 86 05 22; PLOT SIZE: 1.0 m by 2.0 m ; EXPERIMENTAL DESIGN: randomized complete block; REPLICATES: 4; AT APPLICATION: Date and Method: 86 06 25, POST; EQUIPMENT: bicycle sprayer; VOLUME: 400 L/ha; PRESSURE: 200 KPa; CROP GROWTH STAGE: 4-6 leaf; DATE OF ASSESSMENT: 86 07 10 (T1); 86 07 28 (T2); 86 08 04 (T3); 86 08 08 (T4); 86 08 21 (T5); 86 08 28 (T6); 86 09 04 (T7).

TREATMENT	DOSE Kg ai/ha	CRABGRASS POPULATION						
		T1	T2	T3	T4	T5	T6	T7
1. Control	------	100	100	100	100	100	100	100
2. Tridiphane	1.10	58	93	95	100	90	85	100
3. Tridiphane	1.70	55	88	88	95	88	73	100
4. Tridiphane	2.20	30	78	78	93	65	80	93
5. 2,4-D (480 amine)	0.80	93	73	93	85	30	73	93
6. Tridiphane / 2,4-D	1.10 / 0.80	25	88	88	95	90	75	95
7. Tridiphane / 2,4-D	1.70 / 0.80	38	85	83	95	90	88	95
8. Tridiphane / 2,4-D	2.20 / 0.80	25	63	93	95	93	78	98
9. 2,4-D (480 amine)	1.00	90	100	85	93	55	63	98
10. Tridiphane / 2,4-D	1.10 / 1.00	23	93	93	93	80	83	98
11. Tridiphane / 2,4-D	1.70 / 1.00	28	83	83	95	93	93	100
12. Tridiphane / 2,4-D	2.20 / 1.00	23	78	78	83	88	83	93
13. 2,4-D (480 amine)	1.20	95	73	90	78	58	75	98
14. Tridiphane / 2,4-D	1.10 / 1.20	95	93	83	85	73	83	93
15. Tridiphane / 2,4-D	1.70 / 1.20	25	88	88	100	98	85	95
16. Tridiphane / 2,4-D	2.20 / 1.20	23	78	78	90	75	85	95

/ indicates tank mix

Crabgrass was grown as a pure stand. Tridiphane suppressed crabgrass growth for approximately 21 days, however weed control was not adequate even at the highest dose. Addition of 2,4-D to the tank with tridiphane did not antagonize the action of the latter herbicide. In fact, the herbicidal action of tridiphane appears to be enhanced slightly by the addition of 2,4-D to the tank.

USE OF SEWAGE SLUDGE AS A TURF FERTILIZER

J.L. Eggens and N.L. Pierce
Department of Horticulture

Sewage sludge composts produced by the Beltsville Aerated pile method have been used successfully in the production of bedding plants, woody ornamentals and nursery sod. Besides supplying readily available nitrogen and phosphorous, these composts are a good source of organic matter which helps to condition the soil. The objective of this research was to determine the suitability of Windsor composted sewage sludge as a general turf fertilizer.

RESEARCH PROCEDURE

Research plots were established in the fall of 1985 on a predominantly annual bluegrass turf, maintained under fairway conditions. The plots, each 2 x 3 m, were arranged in a randomized complete block design with 4 replications. Treatments consisted of 4 nitrogen sources (soluble urea, calcium nitrate, Milorganite and the Windsor compost) applied at 0, 100, 200, 400 and 800 kg N ha^{-1} (0, 2, 4, 8 and 16 lbs N 1000 ft^{-2}), in 8 applications over the growing season. The plots were evaluated weekly using a scale of 0 to 10 with 10 representing ideal color.

More plots were established on a sand bentgrass nursery at the Weston Golf and Country Club, Weston, Ontario. Nitrogen was supplied as soluble urea or Windsor compost at 0, 12 or 25 kg N ha^{-1} (0, 1/4 or 1/2 lb N 1000 ft^{-2}) every two weeks.

RESULTS

For ease of presentation, the data for each evaluation date (19 in all) have been summarized into groups 1, 2 or 3 weeks after application (Table 1). One week after an application, plots receiving the highest rate of Milorganite and Windsor had the best color, although plots receiving the highest rate of urea were not significantly different from the Milorganite plots. Two weeks after an application the plots with the best color were urea, Milorganite and Windsor compost at the highest application rate, and calcium nitrate at the two highest application rates. Three weeks after an application, plots receiving the Windsor compost at the highest rate had a significantly better color than any other treatment, however, Milorganite and urea at the high application rates performed very well also. At no time during the season was any fertilizer burn evident on the Milorganite or Windsor compost plots, whereas this was not the case for the higher rates of urea and calcium nitrate.

At the higher rate, plots receiving Windsor compost on the bentgrass nursery at Weston Golf Club were not significantly different from those receiving urea (Table 2). At the lower rate, the urea plots showed typical 'speckling' which was not evident at the some rates of Windsor compost.

Table 1. Effect of nitrogen source on the color of a mixed Kentucky bluegrass, annual bluegrass and creeping bentgrass sward.

Treatment	N rate (kg ha^{-1})	# of weeks after application		
		1	2	3
Control	0	6.6 ab	6.3 ab	6.1 a
Urea	100	6.7 abc	6.5 abcd	6.4 bcde
	200	6.6 ab	6.6 cde	6.2 abc
	400	7.0 bcde	7.1 ghi	6.6 def
	800	7.3 de	7.3 ij	6.8 f
Calcium Nitrate	100	6.9 abcd	6.5 abcd	6.3 abcd
	200	6.9 abcd	7.0 fgh	6.3 abcd
	400	7.0 bcde	7.2 hij	6.5 def
	800	6.7 abc	7.2 hij	6.7 ef
Milorganite	100	6.7 ab	6.5 abcd	6.1 ab
	200	6.8 abc	6.7 def	6.4 bcde
	400	7.0 bcde	6.8 efg	6.3 abc
	800	7.3 ef	7.2 hij	6.6 def
Windsor	100	6.6 ab	6.4 abc	6.0 a
	200	6.6 ab	6.8 def	6.1 ab
	400	7.1 cde	7.0 fgh	6.4 bcde
	800	7.7 f	7.4 j	7.0 g

within a column, means followed by the same letter are not significantly different from each other (LSD P=0.5).

Table 2. The effect of nitrogen source on a mixed creeping bentgrass/annual bluegrass nursery.

N Source	N rate (kg ha^{-1})	# of weeks after application			
		1	2	3	5
Control	0	6.9 a	7.0 a	7.3 a	7.0 a
Urea	12	8.3 b	8.4 b	9.0 b	8.0 c
Urea	25	9.l c	9.3 c	9.0 b	7.7 b
Windsor	12	8.6 bc	8.3 b	8.7 b	7.7 b
Windsor	25	9.0 c	9.0 c	9.0 b	8.0 c

within a column, means followed by the some number are not significantly different from each other (LSD P=0.05).

THE EFFECT OF VARIOUS IRON SOURCES ON CREEPING BENTGRASS

J.L. Eggens and N.L. Pierce
Department of Horticulture

Iron deficiency is not an uncommon problem of turf grown on alkaline soils such as those of southern Ontario and particularly sand greens. Iron containing materials can be used to correct turfgrass iron chlorosis. Iron is also becoming popular on areas where nitrogen is kept to a minimum as a method of keeping low nitrogen turf green. Iron sulphate is the most common iron source used on turf today. Its effect on turf is seen immediately upon application but the effect is relatively short lived. However, other iron containing materials give more lasting results and warrant further investigation. Chelated irons and other materials, such as Sul-Fe S and Black Beauty Marcasite are being developed from iron mine tailings. Sul-Fe S or acid iron as it is sometimes known, is a chemical soil amendment containing approximately 79% sulphur, part of which is in a crystalline sulfuric acid form. It is a yellow granular material and the manufacturers suggest it should be applied to soils with a pH of below 7.0 because of its effectiveness in reducing soil pH. Sul-Fe S is produced in the southern United States. Another iron containing material coming out of the southern United States is called Black Beauty Marcasite. This material is a natural ore mined in Nevada and when applied to soil, breaks down rapidly to form iron sulphates and sulphuric acid. Because it is a natural product, it also contains several trace elements such as magnesium, copper, manganese, zinc and boron.

The objective of this study was to evaluate the effect four different iron sources had on the quality of creeping bentgrass.

RESEARCH PROCEDURE

Research plots were established on a predominantly creeping bentgrass sand nursery at the Weston Golf and Country Club, Weston, Ontario. The plots were arranged in a randomized complete block design with 3 replications. Treatments consisted of 4 iron sources, each applied at 3 rates. Iron sulphate was applied at 2, 4 and 6 oz 1000 ft^{-2} with a hand held sprayer. The other three iron sources (chelated iron, Sulf-Fe S and Marcasite) were applied at rates that gave the equivalent amount of iron compared to the 2, 4 and 6 oz of iron sulphate. These iron sources were all granular and were applied as evenly as possible by hand over the plots. Two rates (1 and 5 oz 1000^{-2}) of sulphur were also applied. This area of the nursery received approximately 1/4 lb N 1000 ft^{-2} over the growing season and was cut twice weekly. All treatments were well watered in after application. Application dates were June 19, July 9, July 24, Aug 12, Sept 5 and Oct. 2.

For comparison, some plots in this experiment were sprayed with turf dyes. These dyes are included in the table for interest sake, but this report will focus only on those plots receiving the iron treatments. All plots were evaluated for color, with a rating of 10 representing ideal color, 9 times over the growing season. Soil samples were taken at the end of the experiment and were sent to AgriFood Lab for analysis.

RESULTS

The results for 9 evaluation dates are shown in Table 1. Almost without exception, the application of sulphur alone did not increase turf quality from a color aspect.

The color effect for iron sulphate was immediate and at times the turf blackened at the 6 oz rate.

At no time did any of the plots receiving marcasite score a significantly higher rating than the control plot. Because marcasite has such a high concentration of iron (20-40%), very small amounts are needed and problems arise when attempting to apply it evenly over turf. Especially at the higher rates, the plots would typically have black 'speckles' indicating where the marcasite particles were lying and the turf around the speckles did not receive much iron at all.

Plots receiving the chelated iron source also did not score as well as expected. Although this material was the easiest of the three solids to apply evenly, rarely did any of the plots score better than the control plots.

The superior results come from the Sul-Fe S material, especially at the medium and high rates. The color from these rates was deep and long lasting. At the high rates, small areas of some plots showed signs of burning because of uneven application. However, this was not the typical blackening of the turf as was seen with the other materials, indicating that it was not the iron damaging the turf but probably the sulphur. This material shows much promise and more studies using this material are being planned.

Soil pH was not significantly changed in any of the plots the growing season.

Table 1. The effect of iron sources and turf dyes on the color of a creeping bentgrass sward.

Treat		Date of Evaluation								
		June 21	July 9	July 14	July 18	Aug 1	Aug 8	Aug 15	Sept 5	Oct 24
control		6.0 b	7.0 a	7.0 bc	6.7 abc	7.0 a	7.0 a	7.0 abc	7.0 cde	7.0 ab
$FeS0_4$	L	7.7 de	7.7 ab	7.3 bcd	7.7 cdef	8.3 cd	7.3 ab	8.0 de	7.0 cde	7.0 ab
	M	8.0 e	7.7 ab	7.3 bcd	7.7 cdef	8.0 bc	7.7 bc	8.0 de	7.3 de	7.0 ab
	H	4.7 a	9.0 bc	8.3 de	8.7 fg	8.0 bc	7.7 bc	7.7 cde	7.7 ef	6.7 a
Marc	L	6.3 b	7.3 a	7.0 bc	7.0 a	7.0 a	7.0 a	7.0 abc	6.7 bcd	7.0 ab
	M	6.0 b	6.7 a	6.0 a	6.3 ab	7.0 a	7.0 a	6.7 ab	6.3 ab	7.0 ab
	H	6.0 b	7.0 a	6.7 ab	6.3 ab	7.3 a	7.0 a	7.0 abc	7.0 cde	6.7 a
Sul	L	6.0 b	7.7 ab	7.0 bc	7.3 bcde	7.7 abc	7.0 a	7.3 bcd	7.0 cde	7.3 abc
	M	8.0 e	8.0 abc	7.0 bc	8.0 def	9.0 d	8.0 c	8.3 ef	7.7 ef	8.0 c
	H	8.0 e	9.0 bc	8.3 de	9.3 g	9.9 e	9.0 d	9.0 f	8.3 f	9.7 d
Chel	L	6.0 b	7.3 a	7.0 bc	7.3 bcde	7.0 a	7.0 a	7.0 abc	6.3 abc	6.7 a
	M	6.7 bc	7.3 a	7.3 bcd	7.3 bcde	7.3 ab	7.0 a	6.7 ab	6.7 bcd	7.0 ab
	H	5.0 a	9.3 c	7.3 c	8.3 efg	7.7 abc	7.3 ab	6.7 ab	6.0 ab	7.0 ab
S	L	6.0 b	7.3 a	7.0 bc	6.7 abc	8.0 bc	7.0 a	6.7 ab	6.3 abc	6.7 a
	H	6.0 b	6.7 a	6.0 a	6.0 a	7.0 a	7.0 a	6.7 ab	5.7 a	7.7 bc
Dye	1	6.0 b	7.0 a	6.7 ab	6.0 a	7.0 a	7.0 a	6.3 a	7.0 cde	6.7 a
	2	9.9 g	7.0 a	8.7 e	7.0 abcd	7.0 a	7.0 a	8.0 de	7.0 cde	7.0 ab
	3	9.0 f	6.7 a	8.7 e	7.0 abcd	7.0 a	7.0 a	9.0 f	7.0 cde	7.0 ab
	4	7.0 cd	7.3 a	8.0 de	7.0 abcd	7.0 a	7.0 a	7.0 abc	7.0 cde	9.7 d
	5	8.3 ef	6.7 a	7.7 cd	6.7 abc	7.0 a	7.0 a	8.0 de	7.0 cde	9.9 d

$FeS0_4$ (iron sulphate) Marc (Black Beauty Marcasite) Sul (Sul-Fe S)
Chel (chelated iron) S (sulphur)
L (low rate) M (medium rate) H (high rate)
within a column, means followed by the same letter are not significantly different (LSD P=0.5).

THE EFFECT OF IRON SULPHATE AND WETTING AGENTS ON GOLF COURSE FAIRWAYS AND GREENS

J.L. Eggens and N.L. Pierce
Department of Horticulture

Three important factors to consider when attempting to maintain and/or increase the presence of creeping bentgrass in a sward are (1) keep the mowing height low (2) reduce nitrogen applications and (3) irrigate only when the bentgrass starts showing signs of drought stress. Under these conditions, annual bluegrass cannot compete well with creeping bentgrass. However, these cultural practices (especially keeping the nitrogen low) can give the sward a less than desirable appearance. Iron sulphate applications can counteract this effect temporarily by imparting an immediate color to the sward without encouraging the growth of annual bluegrass.

Wetting agents have been shown to effectively improve leaf surface contact when applied with fungicides and herbicides, as well as reduce the need to irrigate.

The objective of this study was to evaluate the effect of iron sulphate and wetting agents, applied singularly or in combination, and at various rates on the quality of a golf course fairway and a putting green.

RESEARCH PROCEDURE

Research plots were established on a par 3 fairway at the Weston Golf and Country Club, Weston, Ontario. The fairway was cut three times a week with a greensmower and received 3/4 lb N over the growing season. The plots were arranged in a randomized complete block design with 6 replications. The following treatments were applied 7 times over the growing season; wetting agent at a low (usually 2oz 1000 ft^{-2}) and high rate (usually 4 oz 1000 ft^{-2}), iron sulphate at a low, medium and high rate (1 oz up to 6 oz 1000 ft^{-2}), wetting agent and iron sulphate at all combinations and one treatment of iron sulphate at 4 oz 1000^{-2} in distilled water. The amount of material applied depended on the time of year. Application dates were May 5, May 28, June 18, July 8, July 23, Aug. 8 and Oct. 1. All treatments were applied with a pressurized hand held sprayer.

A similar experiment was conducted on an 18 year old creeping bentgrass sward maintained as a putting green at the Horticultural Research Station in Cambridge, Ontario. Application dates were May 11, June 11, July 23, Aug. 7 and Sept. 10.

RESULTS

The Weston plots were evaluated ten times for color, with 10 representing ideal color (Table 1). For all evaluation dates, plots receiving iron sulphate applied with distilled water were not significantly different from plots receiving the some amount of iron sulphate in ordinary tap water. The relatively cooler temperatures associated with the May 5 application contributed to the similarity in color of all the iron treatments. Wetting agent was applied at either 4 or 8 oz 1000 ft $^{-2}$ on this date and the higher rate had the best color of all treatments one day later. On May 29 (one day after the second application) significant differences were evident between the low (2 oz) and high (4 oz) iron rates. The color of plots treated with wetting agent alone (2 and 4 oz) were not significantly different from the control. One week after the second application (June 3), the color of the iron treated plots had decreased dramatically but were still darker than the control. The day following the June 18 application, the addition of wetting agent to the iron sulphate began to result in significant differences. The high rate of wetting agent (4 oz) significantly increased the color of plots treated with low rate of iron sulphate (2 oz). The addition of 2 or 4 oz of wetting agent significantly increased the color of plots receiving 4 oz of iron sulphate. Three days later (June 21) the plots receiving wetting agent in addition to iron sulphate were significantly darker than those receving just iron sulphate. Wetting agent was applied at 4 and 8 oz and iron sulphate was applied at 2, 4 and 6 oz on July 8. One day later, the characteristic blackening of the turf typical of high iron rates was visible only on plots that received 4 or 6 oz of iron sulphate mixed in with either the low or high rate of wetting agent. The addition of either rate of wetting agent improved the color of the low rate of iron sulphate. Plots receiving the high rate of wetting agent had a color equal to plots receiving the two lower rates of iron sulphate. One week later, the blackening seen at the 6 oz rate + wetting agent was still evident, whereas the 4 oz iron + wetting agent plots were not significantly different from plots receiving just 4 oz of iron.

Four days after the Aug. 8 application, the color of plots treated with iron and wetting agent were not significantly different from plots receiving just iron.

The last application date was Oct. 1 when 4 and 8 oz of wetting agent and 2, 4, and 6 oz of iron sulphate was used. Two days later, there was no blackening evident in any of the plots unlike the July 8 application. The high rate of wetting agent combined with the low iron rate significantly improved the color compared to just the low iron. Both rates of wetting agents significantly improved the color of plots when mixed with either 4 or 6 oz of iron.

Results from soil tests taken at the end the experiment have not been received at the time of writing this report.

Similar results were obtained on the bentgrass sward at Cambridge (Table 2). Evaluation dates for this experiment were always the day after application. Except for the first application date, using distilled water instead of tap water did not significantly affect color. For all dates, the higher rate (4 oz) of iron sulphate produced a significantly better color than the lower rate (2 oz). At the high rate of iron sulphate, wetting agents did not significantly affect the color, however at the lower iron rate (2 oz)) the addition of a wetting agent helped to increase color.

The high rate of wetting agent (with or without the iron sulphate) significantly reduced the number of worm costing per plot after a major summer thunderstorm (Table 3).

Table 1. Effect of iron sulphate and wetting agent on the color of a golf course fairway.

Treat		Date of Evaluation									
		May 6	May 29	June 3	June 19	June 21	July 9	July 14	July 24	Aug 12	Oct 3
W	L	7.8 bc	6.3 ab	6.3 a	6.0 a	6.3 a	7.2 d	6.5 a	7.0 bc	6.3 a	6.8 b
W	H	9.2 d	6.0 a	6.0 a	6.5 ab	7.7 d	8.7 e	6.3 a	7.0 bc	6.8 ab	7.7 cd
I	L	7.5 b	6.8 bc	7.5 bc	7.2 bcd	6.3 a	8.0 e	6.3 a	7.8 c	7.3 bc	7.5 c
I	H	8.0 bc	8.2 ef	7.0 b	6.7 abc	7.0 bc	9.5 f	7.8 bcd	7.7 c	8.7 e	8.3 e
I	4	7.7 b	7.7 de	7.3 bc	6.7 abc	6.3 a	8.3 e	7.3 b	7.5 c	8.3 de	7.7 cd
W+I	LL	8.2 bc	7.5 cde	7.7 c	7.7 de	7.5 cd	9.7 f	6.3 a	7.5 c	7.3 bc	7.7 cd
W+I	LH	8.0 bc	9.0 g	7.3 bc	8.5 f	8.3 ef	5.3 ab	8.3 d	5.0 a	8.5 e	9.5 f
W+I	L4	8.5 cd	6.2 ab	6.3 a	7.3 cd	7.3 cd	5.0 a	6.7 a	7.2 bc	8.3 de	8.5 e
W+I	HL	7.7 b	7.3 cd	7.7 c	8.7 f	7.7 d	9.7 f	6.5 a	6.8 bc	7.7 cd	8.2 de
W+I	HH	8.5 cd	8.5 fg	7.3 bc	8.5 f	8.7 f	5.0 a	8.0 cd	5.0 a	8.3 de	9.7 f
W+I	H4	8.2 bc	8.5 fg	7.7 c	8.3 ef	7.8 de	5.5 ab	7.3 b	7.2 bc	8.5 e	9.2 f
DW		6.3 a	6.2 ab	7.3 bc	6.0 a	6.0 a	6.0 a	6.5 a	7.3 c	6.2 a	6.2 a
DW+I	4	7.7 b	8.0 def	6.2 a	6.8 bc	6.5 ab	8.5 e	7.7 bc	6.2 b	8.3 de	8.0 cde
TW		6.3 a	6.0 a	6.0 a	6.0 a	6.0 a	6.3 c	6.7 a	7.0 bc	6.3 a	6.2 a

W (wetting agent) I (iron sulphate) DW (distilled water) TW (tap water)
L (low rate) H (high rate) 4 (4 oz 1000 ft^{-2})
within a column, means followed by the same letter are not significantly different from each other (LSD P=0.5).

Table 2. Effect of wetting agent and iron sulphate on a creeping bentgrass sward.

Treat		Date of Evaluation May 11	June 11	July 23	Aug 8	Sept 10
W	L	7.0 a	7.3 b	8.5 b	7.3 b	7.3 b
W	H	7.0 a	7.5 b	9.3 cd	8.3 cd	8.0 cd
I	L	8.0 b	7.5 b	8.5 b	8.0 bc	8.0 cd
I	H	8.8 cd	8.8 cd	9.5 de	9.3 e	9.3 fg
W+I	LL	8.8 cd	8.5 c	8.8 bc	8.0 bc	7.5 bc
W+I	LH	8.8 cd	8.8 cd	8.8 bc	9.8 e	8.5 de
W+I	HL	8.5 c	8.5 c	9.5 de	9.0 de	9.0 ef
W+I	HH	9.0 d	9.5 d	9.9 e	9.8 e	9.8 g
DW+I	H	8.0 b	8.8 cd	9.5 de	9.5 e	9.0 ef
TW		7.0 a	6.0 a	6.0 a	6.0 a	6.0 a

W (wetting agent) I (iron sulphate) DW (distilled water) TW (tap water)
L (2 oz 1000 ft^{-2}) H (4 oz 1000 ft^{-2})
within a column, means followed by the some letter are not significantly different (LSD P=0.5).

Table 3. Effect of wetting agent and iron sulphate on the presence of worm castings.

Treatment		# of castings/plot
W	L	5.0 c
W	H	1.0 a
I	L	10.0 d
I	H	10.0 d
W+I	LL	4.3 c
W+I	LH	3.5 bc
W+I	HL	1.5 a
W+I	HH	2.0 ab
DW+I	H	10.0 d
TW		12.3 e

W (wetting agent) I (iron sulphate) DW (distilled water)
TW (top water) L (2 oz 1000 ft^{-2}) H (4 oz 1000 ft^{-2})
within a column, means followed by the some letter are not significantly different from each other (LSD P=0.05).

In summary, although the results do vary somewhat, the addition of a wetting agent to low rates (2 oz) of iron sulphate seems to enhance the color. This is also true at high rates of iron sulphate (6 oz) but only in the cooler times of spring and fall. The addition of a wetting agent to high rates of iron sulphate during hot weather will increase blackening of the turf. Wetting agents also seem to decrease the incidence of worm castings on bentgrass greens.

MOWING FAIRWAYS WITH GREENSMOWERS

J.L. Eggens and N.L. Pierce
Department of Horticulture

Golf course fairways have traditionally been mowed lengthwise with pulltype gang mowers having 5, 7 or 9 blade reels. However, the mechanical damage inflicted on turf by these large fairway units, especially during turns, led superintendents to search for more acceptable mowing techniques. Excellent results have been obtained by using greensmowers. These machines are lighter than the traditional fairway units, thereby reducing mechanical damage to the turf, have more blades per reel resulting in a finer cut, can cut at a lower height and come equipped with baskets to facilitate the collection of clippings and seedheads. This is a report on the effect mowing a fairway with a greensmower had on soil compaction, thatch development, bentgrass composition and nitrogen requirement.

RESEARCH PROCEDURE

For the third consecutive year, the same plots located on a par 4 fairway at the Cutten Club in Guelph, have been cut three times a week with either a pull-type gongmower with 7 blade reels at a height of 2.0 cm (3/4 inch) or with a Toro Greensmaster III at 0.9 cm (3/8 inch) fitted with a wiley roller. The clippings were left on half the plots.

Soil compaction was measured using a proving ring penetrometer at the end of the cutting season. Fifteen penetrometer readings were taken one inch below the soil surface for each treatment. Readings were also taken near the front of #8 green where the fairway has been cut with the greensmower for three years and for comparison, at the front of #7 green where the large fairway unit turns around. The thatch layer (30 measurements) of annual bluegrass and creeping bentgrass patches was measured in mid-September, as was creeping bentgrass presence in fifteen 1/2 m^{-2} quadrats. In another area of the fairway that was cut only with the Greensmaster equipped with the baskets, plots were established that received a total of 0, 0.5, 1.0, 1.5, 2.0, 3.0 and 4.0 kg N 100 m^{-2} (0, 1, 2, 3, 4, 6, and 8 lbs N 1000 ft^{-2}) as soluble urea.

RESULTS

Mowing practice significantly affected the amount of creeping bentgrass present in the both the plots where clippings were removed and those where clippings were returned (Table 1). Creeping bentgrass was most prevalent in the areas cut by the greensmower with clippings removed. The plots cut at the higher height had an average of only 1 percent creeping bentgrass.

Creeping bentgrass had significantly more thatch than annual bluegrass in the plots cut with the greensmower (Table 2). Both species had the most thatch on plots where the clippings were returned.

Since the plots cut with the fairway unit didn't contain enough creeping bentgrass to take thatch measurements, the effect of mowing practices on thatch depth could only be measured for annual bluegrass (Table 3). Annual bluegrass plots cut with the greensmower had significantly less thatch than those cut with the fairway unit whether or not the clippings were removed.

At a depth of one inch, the soil was significantly more compacted in the plots that were cut with the fairway unit (Table 4). Similarily, the area just in front of #7 green that has always been cut with a fairway unit, was significantly more compacted than the equivalent area in front of #8 green.

Table 1. Effect of mowing practice on the presence of creeping bentgrass.

Treatment	% bentgrass in 1/2 m^{-2} plots	
	Clippings removed	Clippings returned
Greensmower at 3/8 inch	30.3 a	14.0 a
Fairway unit at 3/4 inch	1.3 b	1.2 b

within a column, means followed by a different letter are significantly different at P=0.01 (t-test).

Table 2. Thatch depth (mm) of creeping bentgrass and annual bluegrass cut at 3/8 inch.

Treatment	3/8 inch mowing ht	
	Clippings removed	Clippings returned
Bentgrass	7. 9 a	11 .5 a
A. bluegrass	2. 5 b	3.6 b

within a column, means followed by a different letter are significantly different at P=0.01 (t-test).

Table 3. Effect of mowing practice on thatch depth (mm).

	Annual Bluegrass Clippings		Creeping Bentgrass Clippings	
	removed	returned	removed	returned
Greensmower at 3/8 inch	2.5 a	3.6 a	7.9	11.5
Fairway unit at 3/4 inch	8.2 b	9.2 b	no bentgrass	

within a column, means followed by a different letter are significantly different at P=0.01 (t-test).

Table 4. Effect of mowing practice on shearing resistance of the soil (lbs $inch^{-2}$).

	Experimental plots	In front of greens
Greensmower	60.4 a	73.4 a
Fairway unit	79.6 b	99.2 b

withing a column, means followed by a different letter significantly different a P=0.05 (t-test).

FACTORS INFLUENCING BIOCONTROL OF GREY SNOW MOLD BY ISOLATES OF *TYPHULA PHACORRHIZA*

M.B. Lawton, L.L. Burpee and L.G. Goulty
Department of Environmental Biology

In previous studies, we obtained >70% suppression of grey snow mold on creeping bentgrass by applying inoculum of *Typhula phacorrhiza* (isolate T011) to turfgrass in November, prior to snow fall. Further investigations were designed to improve the efficacy of biocontrol induced by this low-temperature-tolerant saprophytic fungus. A specific objective was to determine the effect of cellulose, inoculum concentration and time on the potential of isolates of *Typhula phacorrhiza* to suppress grey snow mold (*T. ishikariensis*) on creeping bentgrass.

RESEARCH PROCEDURE

Disease suppression potential of isolates T011 and T016 of T. phacorrhiza was evaluated on two 4 x 9 m swards of creeping bentgrass cv. Penncross with a history of severe infection by *T. ishikariensis*. Treatments in sward 1 included: i) applications of 50 and 200 g/m^2 of grain infested with isolate T011, ii) applications of a 5% w/v suspension of cellulose to untreated plots and to plots treated with 50 g/m^2 of T011 inoculum, iii) application of quintozene at 30 kg a.i./ha and iv) an untreated control and plots treated with heat-killed (autoclaved) inoculum. Treatments in sward 2 included: i) applications of 50, 100, 200, and 400 g/m^2 of grain infested with T016, ii) application of quintozene at 30 kg a.i./ha, iii) applications of 100, 200, and 400 g/m^2 of heat-killed inoculum and iv) an untreated control.

The Horsfall-Barratt rating system was used to estimate disease intensity (% necrotic foliage per plot) at weekly intervals from 30 March 1986 to 26 May 1986. Sclerotia of *T. phacorrhiza* and *T. ishikariensis* in each sward were counted from five soil cores (5 cm diameter) removed from each plot on 31 March 1986.

Residual disease suppression induced by isolate T011 was made by estimating the intensity of grey snow mold on 30 March 1986 in plots of creeping bentgrass treated with 200 g/m^2 of inoculum on 21 November 1984. No supplemental treatments were made to these plots in 1985.

RESULTS

Inoculum of *T. phacorrhiza* suppressed grey snow mold by more than 85%. Disease suppression induced by inoculum of isolate T011 at 50 g/m^2 and 200 g/m^2 was not significantly different from the suppression induced by quintozene (Table 1). Cellulose amendments did not enhance disease suppression (Table 1).

Table 1. Suppression of grey snow mold on creeping bentgrass by isolate T011 of *Typhula phacorrhiza*.

Treatment	Rate	Disease Suppression (%)*
Killed inoculum	200 g/m^2	-23.57 A**
Killed inoculum + cellulose	50 g/m^2 + 5% w/v	-16.73 A
Cellulose	5% w/v	-7.85 A
Killed inoculum	50 g/m^2	19.23 A
Live inoculum + cellulose	50 g/m^2	28.39 A
Live inoculum	50 g/m^2	52.02 B
Live inoculum	200 g/m^2	88.87 B
Quintozene	30 kg a.i./ha	95.35 B

* Mean of four values calculated as a percentage of disease in an untreated plot in each block recorded on 30 March 1986.
** Values followed by same letter are not significantly different at P=0.05 according to cluster analysis.

After snow melt, redevelopment of the turfgrass canopy was more rapid in plots treated with 200 g/m^2 than 50 g/m^2 of isolate T011 (Table 2).

Table 2. Time required for the turfgrass canopy to redevelop and cover >95% of the area in plots of creeping bentgrass infested with *Typhula ishikariensis* and treated with inoculum of isolate T011 of *T. phacorrhiza*.

Treatment	Rate	Time*
T011 inoculum	200 g/m^2	1.25 A**
T011 inoculum	50 g/m^2	3.75 B
T011 inoculum + cellulose	50 g/m^2 + 5% w/v	4.25 B
Untreated	-	7.00 C

* Mean of four values recorded as number of weeks from initial disease rating on 30 March 1986.
** Values followed by some letter are not significantly different at P=0.05 according to cluster analysis.

An increase in the concentration of isolate T016 significantly reduced the time required for redevelopment of the turf canopy, increased the number of sclerotia of *T. phacorrhiza* recovered, but did not increase disease suppression (Table 3).

Table 3. Linear regression of intensity of snow mold suppression, time for >95% of turfgrass canopy to redevelop and number of sclerotia of *Typhula phacorrhiza* recovered versus concentration of isolate T016 of *T. phacorrhiza* applied to creeping bentgrass.

Parameter	Slope Coefficient	r^2	t-value
Disease suppression	5.4×10^{-2}	.13	1.43
Time	-7.3×10^{-3}	.44	3.73*
Number of sclerotia	1.2×10^{-1}	.61	5.32*

*regression significant at P=0.01
**regression significant at P=0.001

Isolates T011 and T016 of *T. phacorrhiza* did not differ in their disease suppression potential. Grey snow mold was suppressed at 5 months but not at 17 months after treatment of isolate T011 at 200 g/m^2 (Table 4).

Table 4. Residual suppression of grey snow mold by isolate T011 of Typhula phacorrhiza applied to creeping bentgrass on 21 November 1984.

Treatment	Rate	Disease Incidence*	
		14/04/85	30/03/86
T011 + grain	200 g/m^2	25.00 A**	60.93 A**
Untreated	-	94.14 B	67.18 A
Grain alone	200 g/m^2	94.73 B	67.18 A

*Mean of four values recorded after snow-melt in 1985 and 1986.
**Within a column, values followed by same letter are not significantly different according to cluster analysis.

Sclerotia of *T. ishikariensis* present in untreated plots were not observed in plots treated with quintozene or with inoculum of isolate T011 or T016.

CONCLUSIONS

1. Isolates of *Typhula phacorrhiza* provide significant biocontrol of grey snow mold on creeping bentgrass.

2. Disease suppression induced by *T. phacorrhiza* inoculum at 200 g/m^2 is equivalent to suppression induced by quintozene at 30 kg a.i./ha.

3. An inverse relationship exists between the concentration of *T. phacorrhiza* applied to turfgrass and the time required for recovery from snow mold injury.

4. Cellulose fails to enhance efficacy of biocontrol by *T. phacorrhiza*.

5. A single application of *T. phacorrhiza* inoculum fails to provide disease suppression for more than one season.

CHEMICAL CONTROL OF PINK AND GRAY SNOW MOLD ON CREEPING BENTGRASS

L.L. Surpee and L.G. Goulty
Department of Environmental Biology

This study was designed to evaluate the potential of several experimental fungicides to suppress pink and grey snow mold on creeping bentgrass. Scotts LDP (quintozene) applied at 300 g a.i./100 m^2 was used as a standard.

RESEARCH PROCEDURE

Treatments were applied to a 9 year old sward of creeping bentgrass in Cambridge, Ontario. Turfgrass cultural treatments were similar to those used for maintenance of golf course putting greens in Ontario. Experimental design consisted of a randomized complete block with four replications. Each treatment plot measured 1 x 3 m. Wettable powder and flowable formulations were applied in 7 L of water per 100 m^2 with a wheel-mounted compressed air boom sprayer at 138 kPa. Scotts LDP was applied with a Scotts drop spreader. Treatments were applied on 3 December. Turfgrass was inoculated with autoclaved rye grain infested with *Microdochium nivale* and *Typhula ishikariensis* on 4 December. Disease intensity was estimated on 30 March.

RESULTS

All treatments, except Bayleton at 15 g a.i./100 m^2 for pink snow mold, provided significant suppression of pink and grey snow mold (Table 1). However, only treatments that resulted in < 3% disease are considered to be acceptable for fine turf.

Table 1. Influence of fungicides on the intensity of snow molds on creeping bentgrass.

Treatment	Rate (g a.i./100m^2)	Grey Snow Mold (%)+	Pink Snow Mold (%)+
Bayleton (triadimefon 50WP)	15	7.03*	47.66
Bayleton	30	2.93*	26.17*
Bayleton	60	2.34*	25.78*
Boyleton	120	2.34*	10.54*
Banner (propiconazole 135 g/1)	15	4.68*	23.44*
Banner	30	2.34*	3.51*
Banner	60	2.34*	2.34*
Banner	120	2.34*	6.44*
Sportak (prochloraz 40EC)	15	19.92*	24.02*
Sportak	30	14.65*	28.71*
Sportak	60	14.65*	12.89*
Sportak	120	4.10*	5.27*
Rovral (iprodione 5OWP)	30	14.65*	18.75*
Rovral	60	7.61*	8.78*
Rovral	120	2.34*	2.93*
Rovral	240	2.34*	2.93*
C06054	30	2.93*	5.27*
C06054	60	2.93*	4.09*
C06054	120	2.34*	4.10*
Rovral Green (iprodione 25F)	30	2.93*	8.20*
Rovral Green	60	2.34*	2.34*
Rovral Green	120	2.34*	2.34*
Rovral Green	240	2.34*	2.93*
Scotts LDP (quintozene 17G)	300	2.34*	2.34*
Rizolex (toclofos methyl 50WP)	120	4.10*	13.47*
UB12382	450++	2.93*	2.93*
Control	-	34.38	60.94

+ Treatments that are underlined provided acceptable control (<3% disease) of pink and grey snow mold.
++ product/100 m^2
* significantly different from control at P=0.05.

CONTROL OF DOLLARSPOT ON CREEPING BENTGRASS

L.L. Burpee and L.G. Goulty
Department of Environmental Biology

Several fungicides were evaluated for suppression of dollarspot disease of creeping bentgrass.

RESEARCH PROCEDURE

Treatments were applied to a 9 year old sward of creeping bentgrass in Cambridge, Ontario. The turfgrass was maintained at a 5 mm cutting height. Cultural practices were similar to those used for maintenance of golf course putting greens in Ontario. The experimental design consisted of a randomized complete block design with four replicates. Thirteen treatments and an untreated control were included in each block. Each treatment plot measured 1 x 2 m. The turfgrass was inoculated with autoclaved rye grain infested with an isolate of *Sclerotinia homeocarpa* on 18 June. Fungicides were applied at 14 d intervals, beginning 9 July, in 7L of water per 100 m^2, with a wheel-mounted compressed air boom sprayer at 138 kPa. Disease intensity was estimated at 7 d intervals, beginning 23 July, using the Horsfall-Barratt rating scale.

RESULTS

All treatments except Daconil 2787 at 22.5 and 30 g a.i./100 m^2 and Moncut at 2.5 and 5 g a.i./100 m^2 provided significant disease control (Table 1). Several treatments resulted in complete suppression of dollarspot for > 14 days.

Table 1. Influence of fungicides on dollarspot disease of creeping bentgrass.

Treatment	Rate (g a.i./100 m2)	Percent Disease	Duration of Control (Days)
XE779	5	0 *	> 14
XE779	10	0 *	7-14
PP523	5	0 *	7-14
PP523	10	0 *	7-14
DPX H6573	7	0 *	> 14
DPX H6573	14	0 *	> 14
DPX H6573	28	0 *	> 14
Daconil	45	0 *	7
Rovral Green	15	0 *	7-14
Daconil	22.5	1.76	< 7
Moncut	2.5	2.34	< 7
Moncut	5	2.34	< 7
Doconil	30	2.34	7
Control	-	2.34	-

* significantly different from control at P=0.05.

